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783 F.2d 1038

54 USLW 2455, 228 U.S.P.Q. 685

In re Charles V. HEDGES and Victor Mark.

*Appeal No. 85-2524.***United States Court of Appeals,
Federal Circuit.***Feb. 12, 1986.*

Martin B. Barancik, Mount Vernon, Ind., argued for appellants. With him on the brief was John W. Schneller, Lyon & Lyon, Washington, D.C.

Henry W. Tarring, Associate Solicitor, Office of the Solicitor, of Arlington, Va., argued for appellee. With him on the brief, were Joseph F. Nakamura, Solicitor and Fred E. McKelvey, Deputy Solicitor.

Before MARKEY, Chief Judge, MILLER, Senior Circuit Judge, and NEWMAN, Circuit Judge.

PAULINE NEWMAN, Circuit Judge.

1 The decision of the United States Patent and Trademark Office (PTO) Board of Appeals (Board), affirming the rejection of claims 8, 9, and 10 of United States patent application Serial No. 301,396 as unpatentable under 35 U.S.C. Sec. 103, is reversed.

OPINION

2 This patent application of Charles V. Hedges and Victor Mark (collectively Hedges or applicant) is for a "Process for Preparing Aryl Sulfone Sulfonic Acids". Claim 8 is representative:

3 8. A process for sulfonating diphenyl sulfone which comprises contacting diphenyl sulfone in its molten state with a sulfonating agent consisting essentially of sulfur trioxide under substantially anhydrous conditions in the absence of a solvent.

4 Hedges' invention is the reaction of diphenyl sulfone, at a temperature above its melting point of 127°C, with liquid or gaseous sulfur trioxide in the absence of water or a solvent, thereby sulfonating the sulfone in high yields without forming by-product sulfuric acid.

5 The only rejection is under 35 U.S.C. Sec. 103, and the Board relied only on Felix U.S. Patent No. 2,010,754. Hedges has cited three additional references, parts of which were discussed by the Board: Mark U.S. Patent No. 3,948,851, British Patent

No. 820,659, and certain pages of a book by Gilbert entitled "Sulfonation and Related Reactions". The PTO Solicitor on this appeal discusses and relies on all these references.

6 Felix shows the sulfonation of aryl sulfones with sulfur trioxide in the form of fuming sulphuric acid. Sulfonation is carried out at 5-10°C, after which the temperature rises exothermically to 30°C before it is lowered to room temperature. The Board held that this, without more, makes a prima facie case of obviousness.

7 Hedges has taken the position, before the Board and before us, that the low temperatures shown by Felix defeat any prima facie case of obviousness of the reaction at above 127°C. Hedges also argues that, viewing the references as a whole, it would not have been obvious to operate in the molten state at high temperatures. The Board held that Hedges had not produced "persuasive objective evidence" in rebuttal.

8 Only after the PTO has made a prima facie case of obviousness does the burden of coming forward shift to the applicant. In re Rinehart, 531 F.2d 1048, 1051, 189 USPQ 143, 147 (CCPA 1976). If a prima facie case is made in the first instance, and if the applicant comes forward with reasonable rebuttal, whether buttressed by experiment, prior art references, or argument, the entire merits of the matter are to be reweighed. In re Piasecki, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed.Cir.1984).

9 In the case before us, we do not agree with the PTO that Felix alone supports a prima facie case of obviousness. Felix makes clear that low temperatures are the desired conditions for this reaction. However, the Solicitor has elaborated on and strengthened the PTO argument by drawing on the additional prior art cited by Hedges. Hedges takes vigorous exception to this procedure, arguing that he has been deprived of the opportunity to respond before the PTO to these "new grounds of rejection" and to produce evidence in rebuttal.

10 We and our predecessor court have not condoned the presentation of new grounds of rejection for the first time on appeal. In re Hounsfield, 699 F.2d 1320, 1324, 216 USPQ 1045, 1049 (Fed.Cir.1982); In re Zeidler, 682 F.2d 961, 967, 215 USPQ 490, 494 (CCPA 1982); In re Nygard, 341 F.2d 924, 928-9, 144 USPQ 586, 590 (CCPA 1965). In Hedges' case the Solicitor referred to new portions of the references cited by Hedges during examination for further support of the same rejection that had been upheld by the Board. Hedges had relied on these references before the Board, as he does before us, for his argument that viewed as a whole the body of prior art teaches away from conducting this reaction at high temperatures. The Solicitor should not be constrained from pointing to other portions of these same references in contravention of Hedges' position. In re Wesslau, 353 F.2d 238, 241, 147 USPQ 391, 393 (CCPA 1965) (the reference is considered in its entirety for what it fairly suggests to one skilled in the art). On these facts, we do not discern that the Solicitor has violated the rule against presenting new issues on appeal. The Solicitor has done no more than search the references of record for disclosures pertinent to the same arguments for which Hedges cited the references.

11 The PTO argues that Felix shows no upper limit to the temperature of the reaction, and that determining the optimum temperature is a matter of "routine experimentation". The plain reading of Felix is contrary to the PTO position. As was said in In re Rosenberger, 386 F.2d 1015, 1018, 156 USPQ 24, 26 (CCPA 1967), "[t]his appears to be an extremely strained interpretation of the reference which could be made only by hindsight."

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To overcome this deficiency in Felix the Solicitor directs attention to the British patent, which discusses the reaction of liquid phenols with liquid sulfur trioxide in the absence of a solvent. The PTO points to the teachings of reaction at elevated temperature:

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The invention is applicable to liquid and solid phenols ... having melting points up to 115°C ... and to mixtures of phenols whose individual melting point is higher than 115°C but which give in admixture a melting point of 115°C or lower.

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For mono-sulphonic acids ... the temperature is kept above the melting point of the phenol used.

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... the liquid sulphur trioxide is added ... at a temperature slightly above the melting point of the phenol in the case of solid phenols, and after the addition the reaction mass is heated at a higher temperature of 160-180°C...

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The highest-melting phenol illustrated in the British patent is resorcinol, melting point 110°C, to which

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liquid sulfur trioxide is added ... at a temperature of 115-140°C.... The product, which is almost black in colour and sets to a brittle solid on cooling, is substantially the monosulphonic acid in quantitative yield.

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The Solicitor asserts that this shows that aromatic compounds can be sulfonated, in the absence of solvent, in the molten state, at the temperatures contemplated by Hedges. Hedges argues that the British patent expressly teaches that the reaction cannot be carried out with phenols that melt higher than 115°, that the upper temperature range reported for resorcinol is reached during the exothermic reaction, and that the black color and brittle product are due to charring and decomposition. Hedges argues that the British patent does not negate the overall teachings of the art as a whole that lower temperatures are preferred for optimum results, and that the charring at higher temperatures that is shown in the British patent belies the broad conclusion that the Solicitor attempts to draw. The cited references support Hedges' position.

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The Mark patent shows diphenyl sulfone sulfonated with sulfur trioxide and states that by "well known methods ... these reactions can be carried out at room temperature or at elevated temperatures such as about 50°C". Mark, who is co-inventor herein, has averred that reaction at 50°C obviously requires the presence of a solvent, because diphenyl sulfone is a solid at 50°C. The PTO does not dispute this point. We do not agree with the Solicitor that Mark is an open-ended teaching of the use of higher temperatures, such as over 127°C, for this reaction, merely because Mark does not state that "about 50°C" is a maximum temperature; that PTO reading is not a reasonable one. Applicant argues that the Mark patent is a further example of the belief then held by those skilled in this art that lower temperatures were needed for optimum results in direct sulfonation reactions. Mark as co-inventor has supported this view with declarations of record.

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Both the Solicitor and the applicant rely on the Gilbert book which, at page 67, discusses the reaction of benzene with sulfur trioxide under various conditions. Gilbert states:

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With both reagents in the vapor phase, a 50% yield of sulfone is obtained at 150-200°C, and 30% at 70-80°C.... Addition of SO₃, either as a liquid or vapor, to liquid benzene gives 15-18% sulfone, but addition of liquid benzene to liquid SO₃

yields 7.5%.

22 Hedges argues that this counters Gilbert's general statement, on which the PTO places great emphasis, that "[p]otentially, the most attractive and practical procedure for sulfonating benzene and other aromatics is by direct reaction with SO₃, since the process is instantaneous, smoothly exothermic, and can involve simple mixing of the two liquids". Hedges points out that despite these "potential" advantages, Gilbert's specific example of the "simple mixing of two liquids" gave only a 15-18% yield.

23 In contrast to Gilbert's 15-18% yield from the reaction of sulfur trioxide with liquid benzene, Hedges obtained a 96% yield from the reaction of sulfur trioxide with liquid diphenyl sulfone. Other portions of Gilbert, discussed by both the PTO and Hedges, are equally subject to conflicting interpretation. We agree with Hedges that Gilbert cannot fairly be given the predictive virtues attributed to it by the Solicitor.

24 Hedges argues that he sulfonates liquid diphenyl sulfone at high temperature without the expected charring or reduced yields, and that "the totality of the prior art disclosures leads substantially away from the claimed invention". We agree with Hedges that the prior art as a whole must be considered. The teachings are to be viewed as they would have been viewed by one of ordinary skill. *Kimberly-Clark v. Johnson & Johnson*, 745 F.2d 1437, 1454, 223 USPQ 603, 614 (Fed.Cir.1984); *In re Mercier*, 515 F.2d 1161, 1165, 185 USPQ 774, 778 (CCPA 1975). "It is impermissible within the framework of section 103 to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art". *In re Wesslau*, 353 F.2d at 241, 147 USPQ at 393. Hedges correctly points out that the references all suggest that lower temperatures of reaction are preferable. No reference suggests that diphenyl sulfone may advantageously be reacted in the molten state with sulfur trioxide. The data provided by Hedges show significant advantages of the claimed invention; these data are not challenged by the PTO.

25 On balance, Hedges proceeded contrary to the accepted wisdom. This is "strong evidence of unobviousness". *W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1552, 220 USPQ 303, 312 (Fed.Cir.1983), cert. denied, --- U.S. ---, 105 S.Ct. 172, 83 L.Ed.2d 107 (1984), citing *United States v. Adams*, 383 U.S. 39, 86 S.Ct. 708, 15 L.Ed.2d 572 (1966).

26 The PTO decision that the invention of claims 8-10 would have been obvious in terms of 35 U.S.C. Sec. 103 is reversed.

27 REVERSED.